

To: James Cashwell
From: Chris Ricardi
Date: May15, 2013
Subject: 51 Eames Street Property Slurry Wall Quarterly Monitoring Program 1Q13 –
March 2013

**DATA VALIDATION REPORT
MARCH 2013 SLURRY WALL GROUNDWATER AND SURFACE WATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS**

TestAmerica Laboratories Data Sets: 480-34802-1 and 480-34803-1

1.0 INTRODUCTION

Groundwater and surface water samples were collected from the Olin Chemical Superfund Site on March 20th and 21st, 2013. Samples were analyzed by TestAmerica Laboratories Inc. in Buffalo, New York. Data were reported in sample delivery groups (SDGs) 480-34802-1 and 480-34803-1. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- Dissolved Metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- Dissolved and Total Metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- General chemistry analyses for ammonia by USEPA Method 350.1 (Lachat 10-107-06-1B), chloride and sulfate by USEPA Method 300.0, nitrate and nitrite by USEPA Method 353.2, and specific conductance by SM 2510B

The Final Interim Response Steps Work Plan (MACTEC, 2007) and the MassDEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MassDEP, 2010] were used as references during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington monitoring tasks. Final sample results are presented on data summaries in Table 2. Sample OC-PZ-17RR was listed on the chain of custody; however, the sample was not collected by Olin personnel and was not crossed off the chain of custody form.

2.0 METALS

Data were reviewed for the following parameters:

- * Data Completeness
- * Holding Time

- * Blanks
 - * Laboratory Control Sample / Laboratory Control Sample Duplicate Analysis (LCS/LCSD)
 - * Matrix Spike / Matrix Spike Duplicate Analysis (groundwater only)
 - * Detection Limits
 - * Dissolved vs. Total Metals Comparison (surface water only)
- * indicates that criteria were met for this parameter

3.0 GENERAL CHEMISTRY – Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

- * Data Completeness
 - * Holding Time
 - * Blanks
 - * Matrix Spike Analysis
 - * Laboratory Duplicate Analysis (ammonia and nitrite only)
 - * Laboratory Control Sample / Laboratory Control Sample Duplicate Analysis
 - * Detection Limits
- * indicates that criteria were met for this parameter

Matrix Spike Analysis – Anions

Matrix spike analyses (MS/MSD) were performed on groundwater samples OC-PZ-25 (chloride only) and OC-GW-78S (chloride and sulfate). Very low recovery (approximately zero percent) was reported in the MS run of sample OC-GW-78S. Based on communications with the laboratory, the MS sample for chloride and sulfate on sample OC-GW-78S was mistakenly not spiked by the laboratory. The percent recoveries in the MSD for chloride and sulfate were within the control limits of 75-125 indicating good recovery in the matrix. The chloride spike recoveries on sample OC-PZ-25 were also within QC limits. The chloride and sulfate data were reported without qualification in the final data set.

Unless discussed above, sample results are interpreted to be usable as reported by TestAmerica.



5/15/13

Chris Ricardi, NRCC-EAC
Senior Chemist

Date



Michael Murphy
Project Principal

6/11/13

Date

References:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, DC 20005.

MACTEC, 2007. "Final Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; August 8, 2007.

Massachusetts Department of Environmental Protection (MassDEP), 2010. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; July 2010.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 - December 1996.

Table 1
Sample Summary
Data Validation Report
March 2013 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				E350.1					
				SW846 6010B	SW846 6010B	(QuickChem	40CFR136A		
				Total	Filtered	10-107-06-1-B)	A2510B	300.0	E353.2
Lab Sample ID	Location	Sample ID	Sample Date	Metals	Metals	Ammonia	Conductance	Anions	Nitrate/Nitrite
Groundwater									
480-34803-1	GW-202D	OC-GW-202D	3/20/2013		2	1	1	2	
480-34803-2	GW-202S	OC-GW-202S	3/20/2013		2	1	1	2	
480-34803-3	GW-25	OC-GW-25	3/20/2013		2	1	1	2	
480-34803-4	GW-78S	OC-GW-78S	3/20/2013		2	1	1	2	
480-34803-5	GW-79S	OC-GW-79S	3/20/2013		2	1	1	2	
480-34803-6	PZ-16RR	OC-PZ-16RR	3/20/2013		2	1	1	2	
480-34803-8	PZ-18R	OC-PZ-18R	3/20/2013		2	1	1	2	
480-34803-9	PZ-24	OC-PZ-24	3/20/2013		2	1	1	2	
480-34803-10	PZ-25	OC-PZ-25	3/20/2013		2	1	1	2	
Surface Water									
480-34802-8	ISCO1	OC-ISCO1	3/21/2013	3	3	1	1	2	2
480-34802-9	ISCO2	OC-ISCO2	3/21/2013	3	3	1	1	2	2
480-34802-10	ISCO3	OC-ISCO3	3/21/2013	3	3	1	1	2	2
480-34802-11	PZ-16RR	OC-PZ-16RRSW	3/21/2013	3	3	1	1	2	2
480-34802-12	PZ-17RR	OC-PZ-17RRSW	3/21/2013	3	3	1	1	2	2
480-34802-13	PZ-18R	OC-PZ-18RSW	3/21/2013	3	3	1	1	2	2
480-34802-14	SD-17	OC-SD-17 SW	3/21/2013	3	3	1	1	2	2

Notes:

Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 04/23/13

Checked by / Date: TLC 05/10/13

Table 2
Final Results Summary
Data Validation Report
March 2013 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				Loc Name		GW-202D		GW-202S		GW-25		GW-78S		GW-79S		PZ-16RR		PZ-18R	
				Field Sample ID		OC-GW-202D		OC-GW-202S		OC-GW-25		OC-GW-78S		OC-GW-79S		OC-PZ-16RR		OC-PZ-18R	
				Field Sample Date		03/20/13		03/20/13		03/20/13		03/20/13		03/20/13		03/20/13		03/20/13	
				QC Code		FS		FS		FS		FS		FS		FS		FS	
				Lab Sample Delivery Group		480-34803-1		480-34803-1		480-34803-1		480-34803-1		480-34803-1		480-34803-1		480-34803-1	
Frac	Method	Analyte	Units	Result		Qual		Result		Qual		Result		Qual		Result		Qual	
F	SW6010	Aluminum	ug/l	6200				200 U				200 U				120 J		200 U	
F	SW6010	Chromium	ug/l	650				3.7 J				9.2				16		8.9	
N	E300	Chloride	mg/l	220				60				170				20		200	
N	E300	Sulfate	mg/l	1300				240				82				500		1100	
N	E350.1	Nitrogen, as Ammonia	mg/l	180				42				41				120		86	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	3200				920				1300				1300		2600	

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary
Data Validation Report
March 2013 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				Loc Name	PZ-24	PZ-25	
				Field Sample ID	OC-PZ-24	OC-PZ-25	
				Field Sample Date	03/20/13	03/20/13	
				QC Code	FS	FS	
				Lab Sample Delivery Group	480-34803-1	480-34803-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	200	U	200	U
F	SW6010	Chromium	ug/l	21		2.5	J
N	E300	Chloride	mg/l	21		16	
N	E300	Sulfate	mg/l	710		470	
N	E350.1	Nitrogen, as Ammonia	mg/l	49		34	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	1800		890	

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 05/14/13

Checked by / Date: TLC 05/14/13

Table 2
Final Results Summary
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				ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR		PZ-18R		SD-17	
Loc Name				OC-ISCO1		OC-ISCO2		OC-ISCO3		OC-PZ-16RRSW		OC-PZ-17RRSW		OC-PZ-18RSW		OC-SD-17 SW	
Field Sample ID				03/21/13		03/21/13		03/21/13		03/21/13		03/21/13		03/21/13		03/21/13	
QC Code				FS		FS		FS		FS		FS		FS		FS	
Lab Sample Delivery Group				480-34802-1		480-34802-1		480-34802-1		480-34802-1		480-34802-1		480-34802-1		480-34802-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	160 J		430		74 J		530		1200		150 J		250	
F	SW6010	Chromium	ug/l	11		68		5 U		170		340		13		120	
F	SW6010	Sodium	ug/l	130000		100000		87000		120000		110000		120000		110000	
N	E300	Chloride	mg/l	190		150		170		190		180		210		160	
N	E353.2	Nitrate as N	mg/l	0.49		1.1		0.87		0.6		0.71		0.5		0.71	
N	E353.2	Nitrite as N	mg/l	0.05 U		0.05 U		0.05 U		0.05 U		0.05 U		0.05 U		0.05 U	
N	E300	Sulfate	mg/l	63		150		35		170		160		73		140	
N	E350.1	Nitrogen, as Ammonia	mg/l	14		19		1.2		23		25		14		20	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	870		850		700		990		960		870		890	
T	SW6010	Aluminum	ug/l	170 J		960		84 J		1800		1800		180 J		1500	
T	SW6010	Chromium	ug/l	13		130		5 U		370		410		12		360	
T	SW6010	Sodium	ug/l	120000		100000		85000		130000		120000		130000		110000	

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 05/14/13

Checked by / Date: TLC 05/14/13

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Reviewer/Date Tyge Cumingham 5-10-13
 Sr. Review/Date Chris Riccardi 5/15/13
 Lab Report # 480-34803-1 : 480-34802-1
 Project # 610713 0016.01.10

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:
 Check items received.

☒ Name of Laboratory ☒ Address ☒ Project ID ☒ Phone # ☒ Sample identification – Field and Laboratory
Client Information: ☒ Name ☒ Address ☒ Client Contact (IDs must be cross-referenced)

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: If no, contact lab for submission of missing certification or certification with correct format.

1.3 Laboratory Case Narrative:

Yes ☒ No ☐ N/A ☐ Comments:

☒ Narrative serves as an exception report for the project and method QA/QC performance. ☐ Narrative includes an explanation of each discrepancy on the Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.

1.4 Chain of Custody (COC) copy present with all documentation completed?

Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes ☒ No ☐ N/A ☐ Comments:

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- ☒ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).
- ☒ Container type noted ☒ Condition observed ☒ pH verified (where applicable) ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Ammonia, – 1 Liter polyethylene/H₂SO₄ to pH<2, cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H₂SO₄ to pH<2, cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H₂SO₄ to pH<2, cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H₂SO₄ to pH<2, cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H₂SO₄ to pH<2, cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H₂SO₄ to pH<2, cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

Yes ☒ No ☐ N/A ☐ Comments:

Sample OC-PZ-17RR was listed
on the COC but not collected
by Olin and was not crossed off
on the COC.

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes ☒ No ☐ N/A ☐ Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes ☒ No ☐ N/A ☐ Comments:

1.6 Sample Results Section: Was the following information supplied in the laboratory report for each sample?

Yes ☒ No ☐ N/A ☐ Comments:

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- ☒ Field ID and Lab ID ☒ Date and time collected ☒ Analyst Initials ☒ Dilution Factor ☒ ~~% moisture or solids~~ ^{N/A} ☒ Reporting limits
☒ ~~Clean-up method~~ ^{N/A} ☒ Analysis method ☒ Preparation method ☒ Date of preparation/extraction/digestion/clean-up and analysis, where applicable
☒ Matrix ☒ Target analytes and concentrations ☒ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes ☐ No ☐ N/A ☐ Comments:

- ☒ Method blank results ☒ LCS recoveries ☒ MS/MSD recoveries and RPDs ☒ ~~Laboratory duplicate results (where applicable)~~ ^{N/A}

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Yes ☐ No ☒ N/A ☐ Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days

Sulfide, TDS, TSS = 7 days

pH = analyze immediately

Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs

Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method

Yes ☒ No ☐ N/A ☐ Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the Yes ☒ No ☐ N/A ☐ Comments:
☒ QAPP/IRSWP ☐ Lab?

Note: The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses,

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therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.

Ammonia* <input type="checkbox"/> = 0.1 mg/ L	Alkalinity** <input type="checkbox"/> = 1 mg/L	Bicarbonate Alkalinity** <input type="checkbox"/> = 1 mg/L	Carbonate Alkalinity** <input type="checkbox"/> = 1 mg/L
Nitrate Nitrogen as N* <input checked="" type="checkbox"/> = .05 mg/L	Nitrite Nitrogen as N* <input checked="" type="checkbox"/> = .01 mg/L	Chloride* <input checked="" type="checkbox"/> = 1 mg/L	Hardness * <input type="checkbox"/> = 2 mg/L
Spec. Cond.** <input checked="" type="checkbox"/> 3 umhos/cm	Total Organic Carbon** <input type="checkbox"/> = 1 mg/L	Oil & Grease* <input type="checkbox"/> = 5.5 mg/L	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 2 mg/L
COD:* Low - 20 mg/L	COD* High - 50 mg/L <input type="checkbox"/>	TDS* <input type="checkbox"/> = 10 mg/L	TSS* <input type="checkbox"/> = 5 mg/L
pH* <input type="checkbox"/> < 2 to > 12	Phenolic - 0.01 mg/L		
Other parameter(list) _____	PQL = _____	<input type="checkbox"/> Source of PQL = _____	
Other parameter(list) _____	PQL = _____	<input type="checkbox"/> Source of PQL = _____	

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

Yes ☒ No ☐ N/A ☐ Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

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4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs).

Yes ☒

No ☐

N/A ☐

Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following:

Yes ☐

No ☒

N/A ☐

Comments:

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = $5 \times$ blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less?

Yes ☒

No ☐

N/A ☐

Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present?

Yes ☒

No ☐

N/A ☐

Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits?

Yes ☐

No ☒

N/A ☐

Comments:

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LCS Limits:

Alkalinity** <input type="checkbox"/> = 80-120%	Bicarbonate Alkalinity** <input type="checkbox"/> = 80-120%	Carbonate Alkalinity** <input type="checkbox"/> = 80-120%	Specific Conductivity * <input checked="" type="checkbox"/> = 80-120%
Total Organic Carbon** <input type="checkbox"/> = 80-120%	TDS** <input type="checkbox"/> = 80-120%	Oil & Grease* <input type="checkbox"/> = 80-120%	Ammonia Nitrogen as N* <input type="checkbox"/> = 80-120%
COD Low* <input type="checkbox"/> = 80-120%	COD High* <input type="checkbox"/> = 80-120%	Nitrate Nitrogen as N** <input checked="" type="checkbox"/> = 80-120%	Nitrite Nitrogen as N** <input checked="" type="checkbox"/> = 80-120%
Hardness* <input type="checkbox"/> = 80-120%	Chloride* <input checked="" type="checkbox"/> = 80-120%	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 80-120%	pH* <input type="checkbox"/> = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes ☐ No ☒ N/A ☐ Comments:

Yes ☒ No ☐ N/A ☐ Comments:

Yes ☒ No ☐ N/A ☐ Comments:

Yes ☒ No ☐ N/A ☐ Comments:

*MS/MSD on GW
 Performed on OC-PZ-25
 for chloride only
 % Recovery were
 w/in Limits.*

*OC-PZ-25
 Ammonia @ 130%, spike was < 4x
 amount in sample no Quals*

Groundwater

OC-GW-78S

	<u>MS</u>	<u>MSD</u>
chloride	0.2%	95
Sulfate	-1	89

*MS not spiked by Lab see email from Becky mason
 OC-PZ-25
 chloride MS MSD
 93% 95%*

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NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$

SA = Spike added

Where: SSR = Spiked sample result
SR = Sample result

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) <input checked="" type="checkbox"/> = 75-125%
Chloride*(SM 4500 Cl) <input checked="" type="checkbox"/> = 75-125%	Specific Conductivity* = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* <input type="checkbox"/> = 75-125%	COD High* <input type="checkbox"/> = 75-125%	Nitrate Nitrogen as N** <input type="checkbox"/> = 75-125%
Nitrite Nitrogen as N** <input type="checkbox"/> = 75-125%	Hardness* <input type="checkbox"/> = 75-125%	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 75-125%	pH* = NA TSS* = NA
Other parameter(list) _____ % R = _____ <input type="checkbox"/> Rec Limits = _____			

* = Laboratory Limits

** = Olin QAPP Limits (MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

TC 5/17/13 Yes ☒ No ☒ N/A ☐ Comments:

MS/MSD RPD Limits:

RPD ≤ 20

OC - GW - 785 TC 5/17/13

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes ☒ No ☐ N/A ☐ Comments:

Ammonia / Nitrite only

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ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3%

Specific Conductivity *☐ = 5%

TSS** ☐ = 6%

TDS** ☐ = 6%

8.0 **Sampling Accuracy**

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes ☐

No ☒

N/A ☐

Comments:

8.2 Do any rinsate blanks have positive results?

Yes ☐

No ☐

N/A ☒

Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

NOTE: MADEP does not require the collection of rinsate blanks.

9.0 **Field Duplicates**

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes ☐

No ☒

N/A ☐

Comments:

9.2 Were field duplicates collected per the required frequency?

Yes ☐

No ☐

N/A ☒

Comments:

QAPP/IRSWP ☐ MADEP Option 1(1 per 20) ☐ MADEP Option 3 (1 per 10) ☐

9.3 Was the RPD $\leq 30\%$ for waters $\leq 50\%$ for soils? Calculate the RPD for results and attach to this review.

Yes ☐

No ☐

N/A ☒

Comments:

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WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes ☒

No ☐

N/A ☐

Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

~~chloride/sulfate estimated (J) in OC-GW-785
due to ms/msd < QC limits~~

TC
5-17-13

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

QC Sample Results

Client: Olin Corporation
Project/Site: Olin Chemical Wilmington Groundwater

TestAmerica Job ID: 480-34803-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 480-108768/123

Matrix: Water

Analysis Batch: 108768

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	19.1		mg/L		95	90 - 110
Sulfate	20.0	19.7	^	mg/L		99	90 - 110

Lab Sample ID: 480-34803-10 MS

Matrix: Ground Water

Analysis Batch: 108768

Client Sample ID: OC-PZ-25

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	16		25.0	38.7		mg/L		93	90 - 110

Lab Sample ID: 480-34803-10 MSD

Matrix: Ground Water

Analysis Batch: 108768

Client Sample ID: OC-PZ-25

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chloride	16		25.0	39.2		mg/L		95	90 - 110	1	20

Lab Sample ID: MB 480-109048/100

Matrix: Water

Analysis Batch: 109048

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.50	0.28	mg/L			03/26/13 13:24	1
Sulfate	ND		2.0	0.35	mg/L			03/26/13 13:24	1

Lab Sample ID: LCS 480-109048/99

Matrix: Water

Analysis Batch: 109048

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	20.0	20.2		mg/L		101	90 - 110
Sulfate	20.0	20.3		mg/L		101	90 - 110

Lab Sample ID: 480-34803-4 MS

Matrix: Ground Water

Analysis Batch: 109048

Client Sample ID: OC-GW-78S

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	21		250	21.4	F	mg/L		0.2	90 - 110
Sulfate	500		250	499	F	mg/L		-1	90 - 110

Lab Sample ID: 480-34803-4 MSD

Matrix: Ground Water

Analysis Batch: 109048

Client Sample ID: OC-GW-78S

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Chloride	21		250	258	F	mg/L		95	90 - 110	169	20
Sulfate	500		250	725	F	mg/L		89	90 - 110	37	20

not spiked by Lab (see email)

199 195

TestAmerica Buffalo

Cunningham, Tige L.

From: Mason, Becky [Becky.Mason@testamericainc.com]
Sent: Friday, May 17, 2013 1:09 PM
To: Cunningham, Tige L.
Cc: Ricardi, Christian S.; Thompson, Peter H.
Subject: RE: Olin Wilm: SGD 480-34803-1: chloride and sulfate Matrix Spike recoveries at 0%

Hi Tige

I just heard back from the lab. The MS wasn't spiked in this case.

Becky

From: Cunningham, Tige L. [mailto:Tige.Cunningham@amec.com]
Sent: Wednesday, May 15, 2013 2:55 PM
To: Mason, Becky
Cc: Ricardi, Christian S.; Thompson, Peter H.
Subject: Olin Wilm: SGD 480-34803-1: chloride and sulfate Matrix Spike recoveries at 0%

Hi Becky

When reviewing the data in SDG 480-34803-1, I noticed the MS for chloride (0.2%) and sulfate (-1) had no recovery for the spike on sample 480-34803-4 MS (see attached page). Can you have the analyst review the spiking log to see if the sample was not spiked. Was there a second analyst that witnessed the spike of this sample? This non-recovery was not very well identified in the narrative. The MSD recoveries for chloride (95%) and sulfate (89%) were fine.

Let us know

Thanks

Tige

Tige Cunningham, NRCC EAC
Project Scientist
AMEC Environment & Infrastructure (Formerly MACTEC)
511 Congress Street, Suite 200 Portland Maine 04101
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LEVEL I DATA QUALITY EVALUATION
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Reviewer/Date Tyge Cunningham 5-9-13
Sr. Review/Date Chr Richards 5/15/13
Lab Report # 480-34802-1 : 480-34803-1
Project # 6107130016.01.10

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:
Check items received.

☒ Name of Laboratory ☒ Address ☒ Project ID ☒ Phone # ☒ Sample identification – Field and Laboratory
Client Information: ☒ Name ☒ Address ☒ Client Contact (IDs must be cross-referenced)

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: If no, contact lab for submission of missing certification or certification with correct format.

1.3 Laboratory Case Narrative:

Yes ☒ No ☐ N/A ☐ Comments:

☒ Narrative serves as an exception report for the project and method QA/QC performance. ☐ Narrative includes an explanation of each discrepancy on the

Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.

1.4 Chain of Custody (COC) copy present with all documentation completed

Yes ☒ No ☐ N/A ☐ Comments:

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of completed COC.

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1.5 Sample Receipt Information (Cooler Receipt Form present?):

Yes ☒ No ☐ N/A ☐ Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

- ☒ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).
☒ Container type noted ☒ sample condition observed ☒ pH verified (where applicable) ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage?

Yes ☒ No ☐ N/A ☐ Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes ☐ No ☒ N/A ☐ Comments:

1.6 Sample Results Section: Was each of the following requirements supplied in the laboratory report for each sample?

Yes ☒ No ☐ N/A ☐ Comments:

- | | | | | | |
|---|--|--|--|---|--|
| <input checked="" type="checkbox"/> Field ID and Lab ID | <input checked="" type="checkbox"/> Date and time collected | <input checked="" type="checkbox"/> Analyst Initials | <input checked="" type="checkbox"/> Dilution Factor | <input type="checkbox"/> % moisture or solids | <input checked="" type="checkbox"/> Reporting limits |
| <input type="checkbox"/> Clean-up method <i>N/A</i> | <input checked="" type="checkbox"/> Analysis method | <input checked="" type="checkbox"/> Preparation method | <input checked="" type="checkbox"/> Date of preparation/extraction/digestion clean-up and analysis, where applicable | | |
| <input checked="" type="checkbox"/> Matrix | <input checked="" type="checkbox"/> Target analytes and concentrations | <input checked="" type="checkbox"/> Units (soils must be reported in dry weight) | | | |

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch?

Yes ☒ No ☐ N/A ☐ Comments:

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☒ Method blank results ☒ LCS recoveries ☐ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

N/A

N/A

ACTION: If no, contact lab for submission of missing or incomplete information.

MS/MSD on GW sample OC-GW-25 w/in limits

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes ☐ No ☒ N/A ☐ Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes ☒ No ☐ N/A ☐ Comments:

Water Digestion 3005A or 3010A or 3020A
Soil Digestion 3050B
Metals 6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the Yes ☒ No ☐ N/A ☐ Comments:
☒ SOW ☐ QAPP ☐ Lab ☐ MADEP

NOTE: Verify that the reported metals match the target list specified on the COC.

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ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements?

Yes ☒ No ☐ N/A ☐ Comments:

NOTE: MADEP requires the method blank to be matrix matched and digested with the samples

4.4 Do any method blanks have positive results for metals? Qualify data according to the following:

Yes ☐ No ☒ N/A ☐ Comments:

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If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = $5 \times$ the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

NOTE: A full target, second source LCS is required by MADEP.

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes ☐ No ☒ N/A ☐ Comments:

Sample Type	MADEP % Rec
Water	80-120
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is $< 30\%$, positive and non-detect results are rejected (R).

Comments:

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6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes ☒ No ☒ N/A ☐ *for GW* *For SW*

Comments:

*Lab Spiked Groundwater
Sample OC-GW-25
Dissolved Al:Cr
Recoveries: RPD w/in
Limits*

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes ☐ No ☐ N/A ☒

Comments:

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes ☐ No ☐ N/A ☒

Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes ☐ No ☐ N/A ☒

Comments:

Sample Type	MADEP % Rec	QAPP % Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$

Where: SSR = Spiked sample result
 SR = Sample result
 SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

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NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?

Yes ☐ No ☐ N/A ☒ Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 **Laboratory Duplicate**

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? Yes ☐ No ☒ N/A ☐ Comments:

NOTE: MADEP refers to this sample as a "matrix duplicate".

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits?

Yes ☐ No ☐ N/A ☒ Comments:

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<u>MADEP Laboratory Duplicate Sample RPD Criteria:</u>	<u>QAPP RPD</u>
For aqueous results $> 5 \times RL$, RPD must be $\pm 20\%$	20
For aqueous results $< 5 \times RL$, RPD must be $\leq RL$	20
For soil/sediment results $> 5 \times RL$, RPD must be $\pm 35\%$	20
For soil/sediment results $< 5 \times RL$, RPD must be $\leq 2 \times RL$	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes ☐ No ☒ N/A ☐ Comments:

8.2 Do any rinsate blanks have positive results?

Yes ☐ No ☐ N/A ☒ Comments:

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes ☐ No ☒ N/A ☐ Comments:

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9.2 Were field duplicates collected per the required frequency?

Yes ☐ No ☐ N/A ☒ Comments:

SOW ☐ QAPP (1 per 10) ☐ MADEP Option 1 (1 per 20) ☐ MADEP Option 3 (1 per 10) ☐

9.3 Was the RPD $\leq 50\%$ for soils or waters? Calculate the RPD for all results and attach to this review. Yes ☐ No ☐ N/A ☒ Comments:

ACTION: RPD must be $\leq 50\%$ for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If results for both total and dissolved are $\geq 5x$ the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

OK Dissolved concentrations were
not $> 10\%$ of total.

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LEVEL I DATA QUALITY EVALUATION – OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes ☐

No ☒

N/A ☐

Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.
- MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.